DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: STP-1105(4) & BHLB-1105(5) Richmond **OFFICE:** Engineering Services
STP-7007(6) & BRSLB-7007(7) Richmond
P.I. Nos.: 245320, 345325, 250610, & 250615
Windsor Springs Road Widening

DATE: February 26, 2008

FROM: Brian K. Summers, PE, Project Review Engineer BKS

TO: Ben Buchan, PE, State Urban Design Engineer

SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate the VE alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT #	Description	Potential Savings/LCC	Implement	Comments
TYPICAL SECTIONS				
TS-1	Eliminate sidewalk on both sides of roadway in undeveloped areas	$554,334	No	There are numerous residential areas as well as schools along the corridor. The sidewalk would provide connectivity for pedestrian traffic.
TS-2	Eliminate bike lanes on both sides of roadway	$1,625,155	No	Since TS-4 will be implemented this VE Alternative is no longer applicable.
TS-3	Construct multi-use path on the left side of road and sidewalk on the right	$1,898,396	No	Since TS-4 will be implemented this VE Alternative is no longer applicable.
TS-4	Construct multi-use paths in lieu of bike lanes and sidewalks on both sides of the road	$2,171,621	Yes	This should be done.

ALT #	Description	Potential Savings/LCC	Implement	Comments
TYPICAL SECTIONS - continued				
TS-5	Reduce the 16-ft. urban shoulder to a 12-ft. urban shoulder	$885,233	No	The 16-ft. shoulders would better accommodate the multi-use paths as well as the numerous utilities along the corridor.
TS-6	Use 11-ft. travel lanes in lieu of 12-ft. travel lanes	$864,238	Yes	This should be done.
TS-7	Reduce median width on Windsor Spring Road to 18-ft.	$147,180 (proposed) $92,840 (actual)	Yes	This will be modified to a 19-ft. width to be used in conjunction with TS-6 so that an 8-ft. wide median can be used at the left turn lane locations.
TS-8	Use 8 in. x 24 in. Type 2 curb and gutter instead of 8 in. x 30 in. Type 2 curb and gutter	$286,010	No	Would require a re-design of the Drainage System. The number of additional catch basins could be significant and would minimize the cost savings for this VE Alternative.
TS-9	Use rural shoulders from STA 154+60 to STA 214+10	$779,310	No	Since Multi Use Paths will be used on this project it is felt that a consistent typical section should be used throughout the limits of this project to provide pedestrian connectivity.
TS-11	Modify drainage to a single longitudinal storm drain with laterals	Design Suggestion	Yes	This should be done.

ALT #	Description	Potential Savings/LCC	Implement	Comments
BRIDGES				
B-1	Omit end spans on the bridge over the Norfolk Southern Railroad and replace with MSE Walls	$434,134	No	Based on a more detailed cost estimate provided by the Design Consultant, the cost savings is approximately $21,337 which doesn't include the re-design costs.
B-2	Lower profile grade line at the Spirit Creek Bridge by 2 ft.±	$87,100	No	Based on a more detailed cost estimate provided by the Design Consultant, the cost savings is approximately $21,100. Also, the community coordination required by FEMA has already been completed and any changes would require additional community coordination.
B-3	Eliminate 90° corners on slope paving at the bridge over Norfolk Southern Railway	Design Suggestion	Yes	This should be done.
GEOMETRY				
G-1	Flatten mainline curve correction in the vicinity of Spirit Creek	$149,575	Yes	This should be done.
G-2	Reduce mainline curve and widen to the left in the vicinity of Turkey Trail Road	$408,000	No	Would result in impacts to a Regional Park which would require that a Section 4(F) evaluation been completed which would impact the project's schedule.

ALT #	Description	Potential Savings/LCC	Implement	Comments
GEOMETRY - continued				
G-3	Provide a 90° skew angle at the Diamond Lakes Way and Turkey Trail Road intersection	-$39,450 (cost increase)	Yes	This would result in better sight distance at this intersection.
G-6	Connect Ebenezer Drive (north and south) to Railroad Avenue and eliminate the Windsor Spring Road to Ebenezer Road (north and south) connections	-$20,830 (cost increase)	Yes	This would result in better sight distance at this intersection.
G-7	Eliminate Spirit Creek Road Extension	$1,995,303	Yes	This should be done.
G-9	Provide access road to commercial properties near intersection with Tobacco Road/ Windsor Spring Road in lieu of driveways	-$197,119 (cost increase)	No	Results in additional costs and would create a new County Road that the County would have to maintain.
G-10	Use abandoned Windsor Spring Road at Plantation Road as a frontage road	$2,743	No	Results in safety and operational concerns since the frontage road will tie so closely to Windsor Springs Road on Plantation Road and could back up traffic on both Windsor Springs Road as well as Plantation Road.
G-11	Eliminate design carryover associated with an overlay for the proposed elevations for the profile grade line	Design Suggestion	No	An overlay is not proposed on this project.

ALT #	Description	Potential Savings/LCC	Implement	Comments
GEOMETRY - continued				
G-13	Evaluate signal warrants at Plantation Road and Boykin Road	Design Suggestion	Yes	This should be done.
G-14	Keep the proposed Spirit Creek Road extension and cul-de-sac Travis Road	$81,570	No	As noted in VE Alternative G-7, Spirit Road will be deleted from this project.
CONTRACT PACKING AND STAGING (CP)				
CPS-1	Release Phase IV and Phase V as one construction contract	Design Suggestion	Yes	This should be done.
CPS-2	Segregate Spirit Creek Road extension into a separate project	Design Suggestion	No	As noted in VE Alternative G-7, Spirit Road will be deleted from this project.

A meeting was held on February 13, 2008 and Wayne Mote, David Griffith, and Ryan Triick with JJ & G, Ben Buchan, Darrell Richardson, and Jan Hilliard with Urban Design, and Brian Summers, Ron Wishon and Lisa Myers of Engineering Services were in attendance.

Additional information was provided by the Project Manager on February 25, 2008.

The results above reflect the consensus of those in attendance and those who provided input.

Approved: Dale M R. **Date:** 3/2/08

Gerald M. Ross, P. E., Chief Engineer

BKS/REW

Attachments

c: Gus Shanine, FHWA
Todd Long
Paul Liles
Bill Duvall
Bill Ingalsbe
Doug Franks
Darrell Richardson
Jan Hilliard
James Magnus
Rusty Merritt
Michael Keene
Terrell McMillan
Ken Werho
Nabil M. Raad
Alexis John
Lisa Myers

received 2/25/08

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: Phase IV: CR 65/Windsor Spring Road
fm Willis Foreman Road to Tobacco Road
STP-7007(6), BRSLB-7007(7)
P.I. No. 250610, 250615

Phase V: CR 65/Windsor Spring Road
fm State Route 88 to Willis Foreman Road
STP-1105(4), BHLB-1105(5)
P.I. No. 245320, 245325

OFFICE: Office of Urban Design

DATE: February 19, 2008

FROM: James B. Buchan, P.E., State Urban Design Engineer

TO: Brian Summers, P.E., State Project Review Engineer

SUBJECT: **Value Engineering Study-Responses**

Reference is made to the recommendations that were contained in the Value Engineering Study - Final Report dated October 25, 2007 for the above referenced projects. Our responses and recommendations are as follows:

1. **VE Recommendation TS-1** – Eliminate sidewalk on both sides of roadway
   Total Cost Savings $554,334
   Urban Design does not recommend implementing this alternative.
   Explanation: This corridor requires pedestrian access due to heavy residential areas on the southern end of the project and both residential and commercial areas on the northern end of the project.

   The historic neighborhood of Hephzibah is located on the southern end of the project and has businesses, homes and ties into residential areas north along Windsor Spring Road. There are three schools on this project. Two are located just north of Willis Foreman Road and one is located at Spirit Creek Road. There are many homes along Windsor Spring Road and businesses on the north end of the corridor approaching Tobacco Road.

   Diamond Lakes Regional Park is a growing park and sports facility that is located north of Willis Foreman Road. This public space attracts many of the local residents and its use will increase as the facility adds more amenities. Due to the schools, residential community, businesses and park, pedestrian connectivity along this corridor is essential to the residents.

2. **VE Recommendation TS-2** – Eliminate bike lanes on both sides of roadway
   Total Cost Savings $1,625,155
   Urban Design does not recommend implementing this alternative.

Explanation: Windsor Spring Road has been identified within the Augusta Regional Transportation Study (ARTS) as a route within a connected network of bicycle and pedestrian facilities linking major destinations in the Augusta area. As noted in VE Recommendation TS-1, there are a number of facilities along Windsor Spring Road that encourage the use of bicycles including the three schools and Diamond Lakes Regional Park.

VE Recommendation TS-4 suggests replacing the bike lanes with multi-use trails on the shoulders. Urban Design agrees with TS-4 over TS-2 as it provides the savings of no bike lanes in the roadway, but will provide bike lanes for the corridor on the shoulder.

3. **VE Recommendation TS-3** – Construct multi-use trail on the left and sidewalk on the right
   Total Cost Savings $1,898,396
   Urban Design does not recommend implementing this alternative.

Explanation: This recommendation is not favorable as there are facilities (schools and a church) on the right side of Windsor Spring Road as well as the left side (a school, a church and Diamond Lakes Regional Park). Also, homes and side roads leading to subdivisions are on both sides of the road.

It should be noted as well that an eight foot multi-use trail is less expensive than a five foot concrete sidewalk. See a comparison in Appendix TS-3. Therefore, VE Recommendation TS-4 will be a greater cost savings.

4. **VE Recommendation TS-4** – Construct multi-use trails in lieu of bike lanes and sidewalks on both sides of the road
   Total Cost Savings $2,171,621
   Urban Design does recommend implementing this alternative depending on public input.

Explanation: This recommendation will provide substantial cost savings and will maintain bike and pedestrian access along the corridor.

Please note that according to AASHTO's *Guide for the Development of Bicycle Facilities – 1999* pp. 33-35, *"Although the shared use path should be given the same priority through intersections as the parallel highway, motorists falsely expect bicyclists to stop or yield at all cross-streets and driveways. Efforts to require or encourage bicyclists to yield or stop at each cross-street and driveway are inappropriate and frequently ignored by bicyclists."* Considering that this corridor has elementary schools and a park with facilities for children (baseball fields), there appear to be more safety concerns by putting bicycle traffic in the roadway than on the shoulders.

It should be noted that the 4 foot bike lane and 16 foot shoulder combined for a 20 foot wide clear zone from the edge of the travel way. By removing the 4 foot bike

lanes on each side of the road, the shoulder break point will be 16 feet from the edge of the travel way instead of 20 feet. Since the cut/fill slopes are 4:1, the clear zone increases from 20 feet to 24 feet.

5. **VE Recommendation TS-5** – Reduce the 16 ft. urban shoulder to a 12 ft. urban shoulder

   Total Cost Savings $885,233

   Urban Design does not recommend implementing this alternative.

Explanation: Reduction of the 16 foot shoulder to 12 feet would have a number of negative affects to the project. Based on VE Recommendation TS-4, the bike lanes in the road will be removed and replaced with 8 foot multi-use trails on the shoulders. The multi-use trails will not fit on 12 foot shoulders and the 4 feet provides extra width for utility relocations.

6. **VE Recommendation TS-6** – Use 11 ft travel lanes in lieu of 12 ft travel lanes

   Total Cost Savings $864,238

   Urban Design does recommend implementing this alternative.

Explanation: This recommendation will not adversely affect safety along the corridor and will provide substantial cost savings.

7. **VE Recommendation TS-7** – Reduce median width on Windsor Spring Road to 18 ft

   Total Cost Savings $147,180

   Urban Design does recommend implementing this alternative if modified to 19 feet instead of 18 feet.

Explanation: The reduction of the median by 2 feet will reduce the median width from 8 feet to 6 feet when a left turn lane is introduced. The width from face of curb to face of curb will be 2 feet. Since catch basins require 4 feet of median width, drop inlets will have to replace the catch basins as drop inlets only require 2 feet of median width. To achieve an equal amount of opening to catch the stormwater, two drop inlets are required to replace each catch basin. Even with equal opening area, the drop inlets still do not allow as much water to enter the structures as a catch basin. Replacing one catch basin with two drop inlets results in an increase of material costs of $111,375 and reduces the Total Cost Savings to $35,805. See Appendix TS-7 for the calculations. The increased material cost doesn't include the effort to redesign the construction plans, drainage profiles and drainage calculations.

Another option is to use a 19 foot wide median. By incorporating the 11 foot lanes as recommended in TS-6 and subtracting this width from a 19 foot median, an 8 foot wide median remains at the left turn locations. This provides enough width so that the catch basins do not need to be replaced by drop inlets.

8. **VE Recommendation TS-8** – Use 8in x 24in Type 2 Curb and Gutter instead of 8in x 30in Type 2 Curb and Gutter

   Total Cost Savings $286,010

   Urban Design does not recommend implementing this alternative.

Explanation: Per the Georgia Standard Details 1033D and 1034D for catch basins, the minimum width of gutter is 2'-0". As noted in the 2004 AASHTO Design Guidelines on page 322, *"Drivers tend to move away from a curb, which reduces effective*

through-lane width." Therefore, moving the curb towards the travel lane on a roadway posted 45 mph will reduce the gutter, thereby decreasing the effective through-lane width.

Also, with the removal of the four foot bike lanes and the decrease of the travel lane from 12 feet to 11 feet, the gutter spread will need to be checked for each structure. Additional structures will be needed along the project which will also increase the cost. As there are over 360 catch basins for these two projects, increasing the number of catch basins by only 10% would increase costs by over $100,000 (36 x $2825/catch basin). This is a significant reduction to the Total Cost Savings.

9. **VE Recommendation TS-9** – Use rural shoulders from Station 154+60 to 214+10
Total Cost Savings $779,310
Urban Design does not recommend implementing this alternative.

Explanation: This corridor is classified as an Urban Minor Arterial and designed with curb and gutter throughout the entire length of the project. There are bike lanes and sidewalks planned due to the proximity of schools, churches, neighborhoods, businesses and Diamond Lakes Regional Park.

Revising the shoulder through this section would remove pedestrian access between Hephzibah historic district and a church on the southern end of the project and Diamond Lakes Regional Park, a church, three schools and the commercial area on the northern end of Windsor Spring Road. Also, there are residential areas on both ends of the project that would be disconnected.

10. **VE Recommendation TS-11** – Modify drainage to a single longitudinal storm drain with laterals
Total Cost Savings – Design Suggestion
Urban Design does recommend implementing this alternative.

Explanation: At first glance, this appears to be a good alternative to decrease construction cost as the length of pipe will decrease. Though, if all of the stormwater is channeled on one side of the road rather than both sides, then the pipe sizes will have to increase for many of the downstream pipes to account for the increase in flow. Also, there are a number of staging and maintenance concerns that arise with this design suggestion since there will be many more cross drains that will have to be constructed and maintained under traffic.

Instead of moving all longitudinal storm drains to one side of the roadway, the design team will investigate moving 18 inch pipes to one side. Since 18 inch pipes usually do not carry maximum capacity, the water from both sides of the roadway can be combined without increasing the pipe sizes. Though, adding more water on the upstream end of a storm system will increase the downstream pipe sizes. Increased pipe sizes along with the staging concern mentioned above will be considered to determine if a single longitudinal system can be utilized in some locations.

11. **VE Recommendation B-1** – Omit end spans on the bridge over the Norfolk Southern Railroad and replace with MSE Walls
Total Cost Savings $434,134
Urban Design does not recommend implementing this alternative.

Explanation: Typically Norfolk Southern Railway would not approve the use of MSE walls near their track and the MSE walls would be located on Norfolk Southern Railway right-of-way. Also, the Bridge Office prefers not to use unwarranted MSE walls on new construction (e.g. using walls to reduce right of way impacts may be warranted).

The costs as calculated in the VE Study were incomplete. The wall unit cost was adjusted to match rates used on current projects and the redesign fee (Table B-1) was added giving a total cost savings of only $21,337. This is a minimal amount of savings. See recalculated costs in Appendix B-1.

12. **VE Recommendation B-2** – Lower profile grade line at the Spirit Creek Bridge by 2ft +/-

Total Cost Savings $87,100

Urban Design does not recommend implementing this alternative.

Explanation: Lowering the profile will not increase safety or provide for better functioning of the road. The redesign fee would be approximately $66,000. This includes $25,000 for a new hydraulic analysis and $15,000 for redesigning the bridge preliminary layout. Also, the Community Coordination required by FEMA for bridge projects has already been completed. Additional Community Coordination would lengthen the project schedule.

13. **VE Recommendation B-3** – Eliminate 90-degree corners on slope paving at the bridge over Norfolk Southern Railway

Total Cost Savings - Design Suggestion

Urban Design does recommend implementing this alternative.

Explanation: Agree with recommendation to reduce concrete slope paving by eliminating the 90-degree corners.

14. **VE Recommendation G-1** – Flatten mainline curve correction in the vicinity of Spirit Creek

Total Cost Savings $149,575

Urban Design does recommend implementing this alternative.

Explanation: The horizontal curve at Spirit Creek can be tightened to reduce the shift of the alignment. Under the current design, the bridge at Spirit Creek could be constructed completely without conflicts with the traffic. Under the VE alternative, the bridge will require staging as traffic will be shifted to construct the eastern half of the bridge. Even so, the savings in right of way costs should compensate for any additional staging costs.

There will be additional redesign fees associated with revising the alignment, profile, cross sections including a new preliminary bridge layout. These fees total approximately $102,000 which reduces the total cost savings to $47,575. See Appendix G-1.

15. **VE Recommendation G-2** – Reduce mainline curve and widen to the left in the vicinity of Turkey Trail Road

Total Cost Savings $408,000

Urban Design does not recommend implementing this alternative.

Explanation: Currently, the construction easement along Windsor Spring Road abuts to the edge of Diamond Lakes Regional Park. By shifting the alignment to the west, the pavement and right of way would encroach onto the park property. Impacting the parkland requires preparing a Section 4(f) evaluation to compare all alternatives analyzed along with submitting addendums to the ecology, history and archeological sections of the environmental document. If there are no changes to the plans, then the addendums would not be required to be submitted with the environmental reevaluation.

16. **VE Recommendation G-3** – Provide a 90-degree skew angle at the Diamond Lakes Way and Turkey Trail Road intersection

Total Cost Savings ($39,450)

Urban Design does recommend implementing this alternative.

Explanation: This recommendation will improve this intersection configuration and provide for better sight angles and turning movements.

17. **VE Recommendation G-6** – Connect Ebenezer Dr (North and South) to Railroad Avenue and eliminate the Windsor Spring Road to Ebenezer Road (North and South) connections

Total Cost Savings ($20,830)

Urban Design does recommend implementing this alternative

Explanation: This recommendation will remove an intersection with poor sight distance and remove a median opening at Ebenezer Dr (north) which is closely spaced to another median opening under 1000 feet south.

18. **VE Recommendation G-7** – Eliminate Spirit Creek Road Extension

Total Cost Savings $1,995,303

Urban Design does recommend implementing this alternative.

Explanation: Spirit Creek Road extension was designed as an option to create a signalized intersection that would provide full access to residents on both sides of Windsor Spring Road. The extension of Spirit Creek impacts many homes and creates many potential relocations. The high cost of the construction and right of way suggests there may be other alternatives that could be less expensive.

19. **VE Recommendation G-9** – Provide access road to commercial properties near intersection with Tobacco Road / Windsor Spring Road in lieu of driveways

Total Cost Savings $($197,119)

Urban Design does not recommend implementing this alternative.

Explanation: The construction of an access road would replace driveways to two properties with one separate driveway. This is not a significant reduction in access points along Windsor Spring Road and therefore, not an improvement in safety. It may cause confusion with "driver expectation" as drivers planning on visiting these businesses must exit Windsor Spring Road prior to reaching their intended location. It also creates a new road that the County must maintain in the future.

20. **VE Recommendation G-10** – Use abandoned Windsor Spring Road at Plantation Road as a frontage road

Total Cost Savings $2,743

Urban Design does not recommend implementing this alternative.

Explanation: Connecting a frontage road to Plantation Road at such close proximity (50-60 feet) to Windsor Spring Road will create additional safety concerns rather than reducing them. For example, vehicles entering the frontage road from Windsor Spring Road will cause backup on Windsor Spring while waiting for an opening to enter the frontage road. Vehicles leaving the frontage road have limited space to enter the left turn lane. Also, vehicles on Plantation Road will not expect a side road this close to the intersection with Windsor Spring and may not yield to crossing traffic from the frontage road.

This recommendation is attempting to reduce conflict points by removing driveways along Windsor Spring Road. Other conflict points and safety issues are created by the introduction of a side road at such a short distance from an intersection.

21. **VE Recommendation G-11** – Eliminate design carryover associated with an overlay for the proposed elevations for the profile grade line

Total Cost Savings (Design Suggestion)

Urban Design does not recommend implementing this alternative.

Explanation: Overlay is not used on this project. The alignment and profile both meet AASHTO and Department guidelines. In order to address design carryover concerns as noted by the VE Team, specific locations of geometric deficiencies should be provided.

22. **VE Recommendation G-13** – Evaluate signal warrants at Plantation Road and Boykin Road

Total Cost Savings (Design Suggestion)

Urban Design does recommend implementing this alternative.

Explanation: This recommendation has already been completed as signal warrants have been evaluated at all intersections along this corridor and the intersections of Plantation Road and Boykin Road have been determined to not warrant signals. See Appendix G-13.

23. **VE Recommendation G-14** – Keep the proposed Spirit Creek Road extension and cul-de-sac Travis Road

Total Cost Savings $81,570

Urban Design does not recommend implementing this alternative.

Explanation: As noted in VE Recommendation G-7, the Spirit Creek extension has high construction and right of way costs and is recommended to be removed from the design.

24. **VE Recommendation CPS-1** – Release Phase IV and Phase V as one construction contract

Total Cost Savings (Design Suggestion)

Urban Design does recommend implementing this alternative.

Explanation: This recommendation reduces costs and will simplify construction coordination and staging. The plans will remain as two separate plan sets to allow the projects to be let separately if needed.

25. **VE Recommendation CPS-2** – Segregate Spirit Creek Road extension into separate project

Total Cost Savings - Design Suggestion

Urban Design does not recommend implementing this alternative.

Explanation: According to VE Recommendation G-7, the Spirit Creek Road extension should not be constructed due to the significant number of relocations and will be removed from the project.

JBB:RT:JCH
Attachments

Appendix TS-3

Cost Comparison

100 ft of Concrete Sidewalk vs Multi-Use Trail

	Length FT	Width FT	Area SF	Area SY	Unit Cost* $/SY	Total Cost $
Concrete Sidewalk	100	5	500	55.56	$60.00	**$3,333.33**
Asphalt Multi-Use Trail	100	8	800	88.89	$28.16	**$2,503.11**

**Unit costs as used by VE Study Recommendation TS-3 (Sheet 4 of 4)*

Appendix TS-7

			Catch Basin Unit Cost	$2,825.00
			Drop Inlet Unit Cost	$3,100.00
	No. of Proposed Catch Basins	Equivalent Drop Inlets	Catch Basin Cost	Drop Inlet Cost
Phase IV	19	38	$53,675.00	$117,800.00
Phase V	14	28	$39,550.00	$86,800.00
			$93,225.00	$204,600.00

Increase Cost to Use Drop Inlets **$111,375.00**

Total Cost Savings	$147,180.00
Cost of Drop Inlets	$111,375.00
Actual Cost Savings	**$35,805.00**

Appendix B-1

		Original Estimate Bridge with 2:1 Slopes			VE Team Proposed Estimate Bridge with MSE walls instead of 2:1 slopes			JJG Estimate of Proposed Alternative Bridge with MSE walls instead of 2:1 slopes		
	units	no of units	cost/unit	cost	no of units	cost/unit	cost	no of units	cost/unit	cost
bridge	SF	18128.01	$ 95.00	$ 1,722,160.61	7081	$ 95.00	$ 672,695.00	7081	$ 95.00	$ 672,695.00
wall	SF			$ -	10994	$ 55.00	$ 604,670.00	10994	$ 80.00	$ 879,520.00
wall barrier	LF			$ -				264	$ 250.00	$ 66,000.00
mainline pavement	SY			$ -	1040	$ 48.20	$ 50,128.00	884	$ 48.20	$ 42,608.80
Additional design cost										
WFIs							$ -			$ 25,000.00
road/bridge							$ -			$ 15,000.00
Total				$ 1,722,160.61			$ 1,327,493.00			$ 1,700,823.80

Wall costs in JJG estimate from bid tab of similar project let in June 2007

Pros	Bridge designed per GDOT Bridge Office and Norfolk Southern Railway preferences.
Cons	Approximately 1.3% more expensive than wall option

Pros	Approximately 1.3% less expensive than bridge with 2:1 slopes option
Cons	Walls would be on Norfolk Southern Railway right-of-way. Redesign, resubmittal, rereview, and reapproval of Bridge PL. Future wall maintenance. Difficulty of constructing bridge end bent with MSE wall.

Appendix G-1

Bridge Costs			**Comments**
Preliminary Layout	$	18,000.00	
Final Design	$	24,000.00	Include bridge staging in design
Hydraulic Report	$	30,000.00	Includes FEMA & community coordination
Addl Survey for Hydro Report	$	10,000.00	
Roadway			
Redesign	$	20,000.00	Revise alignment, profile, cross sections, etc.
Total	**$**	**102,000.00**	

Appendix G-13

TRAFFIC STUDY
for
Windsor Spring Road
in
RICHMOND COUNTY, GEORGIA

Prepared for:

Jordan, Jones & Goulding

Prepared by:

STREET SMARTS®
Planning • Transportation Engineering • Surveying

July 2006

3090 Premiere Parkway • Suite 200 • Duluth, Georgia 30097 • (770) 813-0882

Table 10. Warrant Analysis for Inverness Drive/Boykin Road and Windsor Spring Road

Warrant Number	Title of Warrant	Warrant Satisfied? (Hours Satisfied)
1A	Eight-Hour Vehicular Volume – Minimum Vehicular Volume	No (0)
1B	Eight-Hour Vehicular Volume – Interruption of Continuous Traffic	No (0)
1C	Eight-Hour Vehicular Volume – Combination	No (0)
2	Four-Hour Vehicular Volume	No (0)
3A	Peak Hour – Delay (Volume requirement)	No (0)
3B	Peak Hour – Volume	No (0)

As can be seen from Table 10, for the 2011 opening year, Warrant 1, Warrant 2, and Warrant 3 are not expected to be met at the intersection of Inverness Drive/Boykin Road and Windsor Spring Road.

South Fieldcrest Drive/Patrick Avenue and Windsor Spring Road

The results of the traffic signal warrant evaluation for the 2011 opening year at the intersection of South Fieldcrest Drive/Patrick Avenue and Windsor Spring Road are shown in Table 11. A more detailed breakdown of the analyses is included in Appendix C.

Table 14. Warrant Analysis for Plantation Road and Windsor Spring Road

Warrant Number	Title of Warrant	Warrant Satisfied? (Hours Satisfied)
1A	Eight-Hour Vehicular Volume – Minimum Vehicular Volume	No (0)
1B	Eight-Hour Vehicular Volume – Interruption of Continuous Traffic	No (0)
1C	Eight-Hour Vehicular Volume – Combination	No (1 for 1B)
2	Four-Hour Vehicular Volume	No (0)
3A	Peak Hour – Delay (Volume requirement)	No (0)
3B	Peak Hour – Volume	No (0)

As can be seen from Table 14, for the 2011 opening year, Warrant 1, Warrant 2, and Warrant 3 are not expected to be met at the intersection of Plantation Road and Windsor Spring Road.

Willis Foreman Road and Windsor Spring Road

The results of the traffic signal warrant evaluation for the 2011 opening year at the intersection of Willis Foreman Road and Windsor Spring Road are shown in Table 15. A more detailed breakdown of the analyses is included in Appendix C.